

### **Application of the Friction Stir Welding to Flame-resistant Magnesium Alloys**

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The anisotropy effect of the plate materials as well as the influence of the tool materials on friction stir welding (FSW) of flame-resistant magnesium alloy was investigated. Also, in this test, the possibility that hollow-shaped materials made of flame-resistant magnesium alloy are joined by FSW was investigated varying the tool feed speed and the rotating speed of tool on FSW. The results were as follows, it was found that the application of a tool made of steel with small heat conduction is more desirable than a tool made of ceramics or a tool made of SUS. The joint conditions were influenced by tool materials and anisotropy effect of the plate materials, as well as the feed speed and the rotating speed of the tool used in FSW. Before putting FSW to a practical use, it is necessary to obtain the basic data concerning joints under each condition experimentally. It was shown that surface defects do not appear, even if defects are generated inside the joint of hollow-shaped materials. It is important to check the joint through the observation of its surface and cross-section as well as nondestructive inspection such as X-ray inspection. It was found that the joining hollow-shaped materials under the conditions under which plate materials can be joined is difficult. This is because in the FSW of hollow-shaped materials, the distribution of the heat is more complicated than the FSW of plate materials, which influence the ease of FSW. It is suggested that it is necessary to analyze the distribution of the frictional heat and design a coupler shape for appropriate FSW of hollow-shaped materials.